

As enclosed to IPRP

We claim:

- 5 1. A process for preparing lactones by catalytic carbonylation of oxiranes using a catalyst system comprising
- a) at least one carbonylation catalyst A comprising uncharged or anionic transition metal complexes of metals of groups 5 to 11 of the Periodic Table of the Elements,
- 10 b) at least one metal compound B of the formula (I)



where

- 15 M is an element of group 2, 3, 4, 12, 13,
- R is hydrogen or a hydrocarbon radical which may be substituted on the carbon atoms other than on the carbon atom bound to M,
- X is an anion,
- n is a number corresponding to the valence of M,
- 20 x is in the range from 0 to n, and

- c) at least one organic, chiral compound C that is a bisoxazoline compound and/or comprises at least one chiral alcohol.
- 25 2. A process as claimed in claim 1, wherein enantiomerically enriched lactones are obtained in the process.
3. A process as claimed in claim 1 or 2, wherein the component A is selected so that a cobalt carbonyl compound is present under the reaction conditions.
- 30 4. A process as claimed in any of claims 1 to 3, wherein M in the formula (I) is Al, Mg, Zn, Ti, Zr or Sn.
5. A process as claimed in any of claims 1 to 4, wherein, in the formula (I), R is
- 35 hydrogen or C₁₋₃₂-alkyl, C₂₋₂₀-alkenyl, C₃₋₂₀-cycloalkyl, C₆₋₁₈-aryl, C₇₋₂₀-aralkyl or C₇₋

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₂₀-alkaryl, where substituents may be present on the carbon atoms other than the carbon atom bound to M,

and/or X is Cl, Br, I, sulfonate, oxide, C₁₋₃₂-alkoxide or amide.

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6. A process as claimed in any of claims 1 to 5, wherein the component B is $\text{AlCl}_x\text{R}_{3-x}$, where x is from 0 to 3 and R is C₁₋₆-alkyl.

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7. A process for preparing a catalyst system by mixing the components A, B and C as set forth in any of claims 1 to 6 in any order.

8. A catalyst system comprising the components A, B, C as defined in any of claims 1 to 7.

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9. The use of a catalyst system as claimed in claim 8 in carbonylation reactions.